

**REMARKS**

Applicants had previously made an amendment after final. As per MPEP § 706.07(h).III.D, Applicants request entry of the amendment made after final. Accordingly, claims 2 and 5-11 are pending in the application. In this amendment, claim 2 has been further amended and claim 26 has been added, leaving claims 2, 5-11, and 26 for consideration upon entry of the present Amendment. Applicants' remarks are directed to the Examiner's rejections in the Final Office Action.

Claims 2, 5-14, and 17-25 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that applicant regards as the invention. In particular, the Examiner asserts that if R1 is 10 m as recited, the object could be behind the detector placed at 1.4 m (R2). The Examiner asserts that the configuration is not operative. Applicants respectfully traverse. R1 is a distance between an X-ray tube and an object and R2 is a distance between the object and an X-ray detector. See Figure 1. Thus, even if R1 is 10 m, the object could not be behind the detector. Moreover, Applicants have amended claim 2 to reflect that the upper limit of R1 is 5 m. This change is supported in the specification at page 16 at the second complete paragraph. The specification describes the following: "Generally, facilities for medical service or inspection has a limitation for a spatial margin. Therefore, in the present invention, it may be preferable that R1 is not larger than 5 (m)." Applicants respectfully request that the Examiner withdraw this rejection.

Claims 2, 5, 6, 12, 14, 17, 18, and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Malcolm et al. (US 4,979,198) ("Malcolm"). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, "[t]he identical invention must be shown in as complete detail as is contained in the \* \* \* claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Because claims 12, 14, 17, 18, and 24 have been canceled, Applicants arguments are directed towards, claims 2, 5, and 6.

First, claim 2 has been amended to limit the size of the focal spot to be 100  $\mu$ m to 600  $\mu$ m. This limitation is supported in the specification on page 26, line 7, which discloses the preferable range of the size of the focal spot for mammography. Accordingly, since the subject matter of amended claim 2 is directed to mammography, or radiographing an object of a breast,

the size of the focal spot has been amended so as to conform with the subject matter of mammography. Accordingly, the focal spot range of  $100\text{ }\mu\text{m}$  to  $600\text{ }\mu\text{m}$  is a patentable distinction over the previous range of  $30\text{ }\mu\text{m}$  to  $1000\text{ }\mu\text{m}$ , because the range now conforms to the radiographing an object of a breast.

The Examiner states that in Malcolm at column 8, lines 45-48, Malcolm explains that the SOD (R1) is 6.5-10cm, and at column 7, lines 10-14, Malcolm explains that SID (R2) is 25-35 cm. Applicants respectfully submit that the Examiner may be misunderstanding R2.

Claim 2 includes the following limitation: "**setting a distance R2 between the object and an X-ray detector** so as to be within a range defined by the following formula:  $0.15\text{ m} \leq R2 \leq 1.4\text{ m}$ ." (Emphasis supplied.) In Malcolm at column 7, Malcolm explains that a **source to image receptor** distance is 25 cm, preferably in the range of 30 to 35 cm. The source to image receptor distance corresponds to a total distance between the X-ray tube and the X-ray detector, which is obtained by the sum of R1 and R2 in the present invention. Accordingly, because Malcolm merely teaches a total distance of R1 and R2 and teaches nothing about the distance R2 between the object and the X-ray detector, Malcolm does not anticipate claim 2.

In addition, because the range has now been changed, the lower limit value of the distance R1 for the size of the focal spot of  $100\text{ }\mu\text{m}$  is 0.47, as shown in Table 1 (page 16 of the specification). Thus, the distance (R1+ R2) between the X-ray tube and the X-ray detector is at least 0.65 m or more.

Moreover, Malcolm expressly teaches that the X-ray source to the image receptor distance should not exceed about 50 centimeter, or 0.5 m. See col. 6, line 63 to col. 7, line 3. Thus, because Malcolm does not teach or suggest the claimed range and, in fact, teaches away from the claim range, Malcolm does not anticipate claim 2.

In addition, claim 2 includes the following limitation: "**setting a distance R1 between the X-ray tube and an object of a breast.**" (Emphasis supplied.) Thus, claim 2 is now directed towards mammography. In mammography, it is difficult to detect different substances such as a fiber organization, a calcified substance, and a tumor. See page 31, lines 3-7. The advantage of claim 2 is that by determining the positional relationship among the X-ray tube, the object of a breast, and the X-ray detector in accordance with the size of the focal spot of the X-ray tube, it provides a technique to provide an edge enhancement to make it easy to detect different substances.

In contrast, Malcolm teaches a diagnostic tool for the viewing of non-torso extremities such as hands, arms and legs. The tool is a small, portable, hand-held X-ray generating means in the form of C-shaped housing to radiograph hands, arms, and legs. See Column 2, lines 55-56. Since the diagnostic tool is for hands, arms, and legs, Malcolm does not teach or suggest using the tool for mammography. Thus, Malcolm does not teach or suggest about radiographing an object of a breast.

Furthermore, claim 2 conducts an edge enhancement by determining the positional relationship among the X-ray tube, the object of a breast, and the X-ray detector. On the other hand, Malcolm merely teaches about the image resolution and suggest to use a special device of an image intensifier in the fiber optical components. See col. 6, lines 35-60. From such a special device of an image intensifier, it would not have been obvious to conceive the radiographing positional relationship of the claim 2.

Accordingly, because Malcolm does not teach the distance of R2 and also does not teach about an object of a breast, Malcolm does not anticipate claim 2. Because claims 5 and 6 include all of the limitations of claim 2, Malcolm does not anticipate claims 5 and 6. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection as to claims 2, 5, and 6.

Claims 8-11, 13, 20-23, and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Malcolm in view of Diemer et al. (US 4,622,688) ("Diemer"). For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Because claims 13, 20-23, and 25 have been canceled, Applicants arguments are directed towards claims 8-11.

As explained above, Malcolm does not teach or suggest all of the limitations of claim 2. Because claims 8-11 include all of the limitations of claim 2, Malcolm also does not teach or suggest all of the limitations of those claims. In addition, Diemer does not remedy the deficiencies of Malcolm.

In addition, claim 26 has been added, which depends from claim 2. Because claim 2 is allowable, claim 26 is also allowable. Applicants respectfully request that the Examiner allow claim 26.

Accordingly, because Malcolm and Diemer do not teach the distance of R2 and also do not teach about an object of a breast, thus, claims 8-11 are allowable. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection as to claims 8-11.

In addition, attached hereto is a marked-up version of the changes made to the application. The attached page is captioned "**Version with Markings to Show Changes Made.**"

In view of the foregoing, it is respectfully submitted that the instant application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance issued. If the Examiner believes that a telephone conference with Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is cordially requested to telephone the undersigned.

In the event the Commissioner of Patents and Trademarks deems additional fees to be due in connection with this application, Applicants' attorney hereby authorizes that such fee be charged to Deposit Account No. 06-1130.

Respectfully submitted,

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November 19, 2002

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE****IN THE CLAIMS:**

Please amend claim 2 in "marked up" format, as follows:

2. (Marked up/Amended three times) An X-ray image radiographing method of radiographing an object of a breast, comprising using an X-ray tube having a size D of focal spot defined by the following formula:

$$30\text{-}100\text{ }\mu\text{m} \leq D \leq 1000\text{-}600\text{ }\mu\text{m};$$

setting a distance R1 between the X-ray tube and an object of a breast so as to be within a range defined by the following formula:

$$(D-7)/200\text{ m} \leq R1 \leq 40\text{-}5\text{ m}; \text{ and}$$

setting a distance R2 between the object and an X-ray detector so as to be within a range defined by the following formula:

$$0.15\text{ m} \leq R2 \leq 1.4\text{ m}.$$